

The opinion in support of the decision being entered today was *not* written for publication in and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

*Ex parte* JOSEPH DAVID RIGNEY and MAGDI NAIM AZER

---

Appeal No. 2006-0866  
Application No. 10/086,148  
Technology Center 3700

---

ON BRIEF

---

Decided: February 27, 2007

---

Before MURRIEL E. CRAWFORD, ROBERT E. NAPPI, and

ANTON W. FETTING *Administrative Patent Judges.*

CRAWFORD, *Administrative Patent Judge.*

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. §134 from the examiner's final rejection of claims 2 to 27, which are all of the claims pending in this application. Claim 1 has been cancelled. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

The appellants' invention relates to a method for replacing a damaged Thermal Barrier Coating (TBC) ceramic layer. An understanding of the invention can be derived from a reading of the claims which are appended to the brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Skelly	5,419,971	May 30, 1995
Nagaraj	5,723,078	Mar. 3, 1998

Claims 2, 4, 8, 9, 21 to 23 and 27 stand rejected under 35 U.S.C. §102(b) as being anticipated by Nakaraj.

Claims 2 to 27 stand rejected under 35 U.S.C. § 103 as being anticipated by Nagaraj in view of Skelly.

Claim 2 recites:

2. A process for localized repair of a turbine component having a surface with a damaged thermal barrier coating system comprising the steps of:

cleaning a spalled region of the surface of the component with damage;  
texturing the surface with damage to produce a textured surface having an array of spaced grooves of predetermined groove spacing, predetermined groove geometry, and predetermined wall angle with the exposed surface by impinging a high energy beam on the exposed surface to produce the array; and

depositing a replacement thermal barrier coating over substantially only the textured surface.

The appellants contend that Nagaraj does not anticipate the subject matter of claims 2, 4, 8, 9, 21 to 23 and 27 because in appellants' opinion, Nagaraj does not disclose a step in which the bond layer is texturized so as to produce a textured surface having an array of spaced grooves of predetermined groove spacing, predetermined groove geometry and predetermined wall angle ("bond texturizing

step”). The appellants further contend that claims 2 to 26 would not have been obvious in view of the teachings of Nagaraj and Skelly. Specifically appellants contend that there is no motivation to combine the teaching of Nagaraj and Skelly.

The examiner contends that Nagaraj does disclose the bond texturizing step. Further, examiner contends that Skelly discloses the bond texturizing step and that there would have been motivation to modify the method disclosed in Nagaraj so as to include the bond textuizing step.

### ISSUES

Does Nagaraj describe a method for repairing a damaged surface layer of a turbine component surface which includes the step of texturizing the surface to produce a textured surface having an array of spaced grooves of predetermined groove spacing, predetermined grove geometry and predetermined wall angle?

Would there have been motivation for a person of ordinary skill in the art to combine the teachings of Nagaraj and Skelly so as to arrive at the claimed invention?

### FINDINGS OF FACT

Nagaraj teaches that in order to be effective, a thermal barrier coatings must adhere strongly to the component coated (col. 1, lines 29 to 33). The challenge in forming these thermal barrier coatings is to form a coating that is less susceptible to spalling (col. 1, lines 55 to 58). In order to achieve this purpose, thermal barrier coatings include a bond layer between the component to be coated and the overlying ceramic layer (col. 1, lines 40). The Nagaraj method is directed to a method of repairing a thermal barrier coating after the bond coat has spalled and includes the steps of texturizing the portion of the bond surface which has spalled

(col. 4, lines 62 to 63). Nagaraj teaches that the texturizing may be achieved by grit blasting, micromachining, photolithography, laser etching or water jet techniques (col. 4, lines 63 to 66). If a laser is used, a groove pattern is selectively developed on the surface of the bond layer using laser techniques (col. 5, lines 14 to 20). The texturizing must result in an average roughness  $R_a$  of at least about 300 micrometers (col. 5, lines 10 to 13).

Skelly describes a method of fabricating a component for a turbine engine, coated with a thermal barrier coating, which includes the step of texturizing a bond layer (col. 5, lines 28 to 34). Skelly teaches that the texturizing of the bond coat is done so as to produce a preselected controllable pattern which achieves an optimum crack impeding geometry thereby reducing spallation of the bond layer (col. 3, lines 32 to 34). The texturizing is done by utilizing a laser (col 3, lines 36-40).

#### PRINCIPLES OF LAW

To support a rejection of a claim under 35 U.S.C. § 102(b), it must be shown that each element of the claim is found, either expressly described or under principles of inherency, in a single prior art reference. See Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

The examiner bears the initial burden of presenting a prima facie case of obviousness See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993), which is established when the teachings of the prior art itself would appear to have suggested the claimed subject matter to one of ordinary skill in the art. See In re Bell, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993). This is not to say, however, that the claimed invention must expressly be suggested

in any one or all of the references, rather, the test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See Cable Electric Products, Inc. v. Genmark, Inc., 770 F.2d 1015, 1025, 226 USPQ 881, 886-87 (Fed. Cir. 1985).

A disclosure that anticipates under 35 U.S.C. § 102 also renders the claim unpatentable under 35 U.S.C. § 103, for "anticipation is the epitome of obviousness." Jones v. Hardy, 727 F.2d 1524, 1529, 220 USPQ 1021, 1025 (Fed. Cir. 1984). See also In re Fracalossi, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982); In re Pearson, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974).

## ANALYSIS

As Nagaraj discloses a groove pattern which is selectively developed, Nagaraj inherently discloses a groove pattern that is predetermined. A person developing the groove pattern of Nagaraj would have to have a pattern in mind before utilizing the laser in order to selectively develop the pattern. Such determination in mind prior to the development of the pattern is a predetermination of the pattern. The disclosure in Nagaraj that the texturizing in Nagaraj must achieve a predetermined roughness supports this holding that the groove pattern is predetermined. As such, the disclosure of Nagaraj inherently discloses the texturizing of the bond layer.

Because Nagaraj discloses each and every element of the claimed subject matter, the Nagaraj disclosure alone is sufficient to support a rejection of the claims under 35 U.S.C. § 103. In addition, even if Nagaraj alone did not suggest the claimed subject matter, as Nagaraj teaches that it is important that the thermal

Appeal Number: 2006-0866  
Application Number: 10/086,148

barrier coating on a turbine component be resistant to spalling, and Skelly teaches that a preselected controlled pattern reduces spalling, we hold that a person of ordinary skill in the art would have found it obvious to produce a preselected controlled pattern for the groove pattern disclosed in Nagaraj in view of the combined teachings of Nagaraj and Skelly.

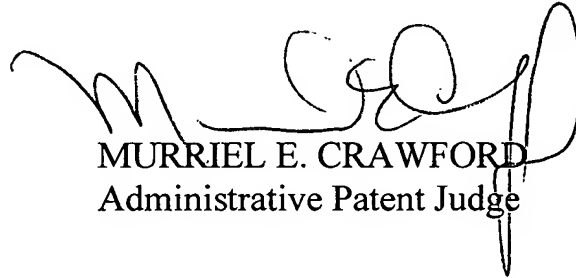
#### ORDER


The examiner decision is affirmed.

Appeal Number: 2006-0866  
Application Number: 10/086,148

No time period for taking any subsequent action in connection with this appeal  
may be extended under 37 CFR § 1.136(a).

AFFIRMED

  
MURRIEL E. CRAWFORD  
Administrative Patent Judge

  
ROBERT E. NAPPI  
Administrative Patent Judge

  
ANTON W. FETTING  
Administrative Patent Judge

)  
)  
)  
)  
)  
)  
) BOARD OF PATENT  
) APPEALS  
) AND  
) INTERFERENCES  
)  
)  
)  
)

Appeal Number: 2006-0866

Application Number: 10/086,148

MCNEES WALLACE & NURICK LLC

100 PINE STREET

P.O. BOX 1166

HARRISBURG, PA 17108-1166

MEC/jrg